

### 1. Cell Body

The cell body is variable in size and shape. The size varies from 5 to 120 $\mu$  in diameter. The shape may be rounded, flask-shaped or polygonal.

It consists of (1) Nucleus and (2) Cytoplasm.

1. **Nucleus** : It is single, central and spherical and contains a large nucleolus.

2. **Cytoplasm** : It contains the following structures—

(i) *Nissl's Granules* : These are granular masses with affinity for basic aniline dyes. They are present in the nerve cell bodies and their dendrites, but are absent in the axons including their sites of origin.

The cytoplasm remains clear at the site of origin of an axon from the cell body due to absence of Nissl's granules. This clear zone of cytoplasm is known as *Axon-hillock*.

Motor neurons have larger granules. Fatigue, certain toxins and poisons, and sectioning cause Nissl's granules to disintegrate and finally disappear. Chemically these granules are composed mainly of RNA (ribonucleic acid), protein and iron. Nissl's granules are involved in protein synthesis and utilize them during the activity of the cell.

(ii) *Neurofibrils* : These are fine threads of variable length which traverse the cytoplasmic matrix of the cell body and its processes forming a loose network of fibrils. They are seen by silver impregnation technique.

(iii) *Mitochondria* : They appear as thread-like or rod-shaped spherical or ellipsoidal bodies under the optical microscope. They are scattered throughout the cytoplasm, and also extend into the processes. They are concerned with the metabolism of the cell.

(iv) *Golgi apparatus* : It appears as a coarse, irregular network near the nucleus and may extend into dendrites.

(v) *Pigments* : They may be seen in the cell body as orange yellow granules or aggregates of lipochrome fat.

### 2. Cell Processes

1. **Dendrites** : These are short processes which are directly continuous with the cytoplasm of cell body. They contain Nissl

bodies (granules), mitochondria and neurofibrils. They lack a myelin sheath and neurolemma. Dendrites carry impulses towards the cell body.

2. **Axons** : They are long, slender, thread-like processes. They usually arise from the cell body at the axon-hillock but sometimes from dendrites. An axon may give branches at right angles, called *collaterals*. The terminal branches are called *telodendria*. The cytoplasm of axon is called *axoplasm* and the surface membrane as *axolemma*.

**MYELIN SHEATH** : Majority of axons are surrounded by a lipid sheath of myelin which gives them a white colour. It is responsible for the white appearance of many peripheral nerves and of the white matter in CNS.

The myelin sheath is not continuous but is interrupted at intervals by constrictions called *Nodes of Ranvier*.

The axons which lack a myelin sheath appear grey. The post-ganglionic fibres of Autonomic nervous system (ANS) are characteristically unmyelinated and are thus grey in colour.

Based on myelin sheath covering, axons are described as of 2 types : (i) Myelinated (Medullated),

(ii) Unmyelinated (Non-medullated).

**NEUROLEMMA** (Sheath of Schwann) : It is a delicate sheath which closely invests peripheral nerves, whether myelinated or unmyelinated. It consists of Schwann cells. It is essential for regeneration of nerve fibres. It is not present in nerve fibres within brain or spinal cord.

**ENDONEURIUM** (Sheath of Henle) : It is a fine connective tissue sheath which is present outside the neurolemma in peripheral nerves.

### TYPES OF NEURONS :—

(1) **Golgi type I neurons** : These are large neurons and have long axons connecting different parts of the nervous system.

(2) **Golgi type II neurons** : These neurons are small and have short axons which may sometimes be absent.

### II. NEUROGLIA

These are non-excitable cells and form the main supporting tissue of CNS.